

WHAT IS CLAIMED IS:

1. An optical recording apparatus for recording a hologram in an optical recording medium, comprising:

a spatial light modulator which modulates light incident from a single light source and generates signal light and reference light, the spatial light modulator modulating the signal light according to a signal to be recorded in the optical recording medium to cause a polarization direction of the signal light to have a predetermined polarization direction and to cause a polarization direction of the reference light to have a direction crossed at right angles with the predetermined polarization direction;

a wavelength plate which converts the signal light and the reference light, which have been generated by the spatial light modulator, into circularly polarized light in which the signal light and the reference light revolve in directions opposite to each other; and

a condensing optical system which condenses the circularly polarized light, which has been converted by the wavelength plate and in which the signal light and the reference light revolve in directions opposite to each other, into a predetermined area of the optical recording medium.

2. An optical recording apparatus according to claim 1, wherein a holographic optical element for forming a

predetermined wavefront for the reference light is further arranged between the spatial light modulator and the wavelength plate.

3. An optical recording apparatus according to claim 2, wherein the holographic optical element is a light diffuser which diffuses the reference light.

4. An optical recording apparatus according to claim 1, wherein the spatial light modulator comprises a transmissive liquid crystal cell in which transparent electrodes are formed on both surfaces of a plate-shaped liquid crystal, a first polarizing plate which is arranged on a light incident side of the liquid crystal cell and transmits light of the predetermined polarization direction, and a second polarizing plate which is arranged on a light outgoing side of the liquid crystal cell and transmits light of any polarization direction at a substantially central portion thereof and transmits light of the predetermined polarization direction at a portion thereof surrounding the substantially central portion.

5. An optical recording apparatus according to claim 4, wherein the spatial light modulator is a liquid crystal panel for a projector.

6. An optical recording apparatus for recording a hologram in an optical recording medium, comprising:

a spatial light modulator which modulates light incident from a single light source and generates signal light and

reference light, the spatial light modulator modulating the signal light according to a signal to be recorded in the optical recording medium to cause a polarization direction of the signal light to have a predetermined polarization direction and to cause a polarization direction of the reference light to have a polarization direction crossed at right angles with the predetermined polarization direction;

an azimuth rotator which rotates the polarization directions by a predetermined angle, the rotated signal light and rotated reference light being linearly polarized light; and

a condensing optical system which condenses the linearly polarized light, whose polarization directions have been rotated by the azimuth rotator, into a predetermined area of the optical recording medium.

7. An optical recording apparatus according to claim 6, wherein a holographic optical element for forming a predetermined wavefront for the reference light is further arranged between the spatial light modulator and the azimuth rotator.

8. An optical recording apparatus according to claim 7, wherein the holographic optical element is a light diffuser which diffuses the reference light.

9. An optical recording apparatus according to claim 6, wherein the spatial light modulator comprises a transmissive liquid crystal cell in which transparent electrodes are formed

on both surfaces of a plate-shaped liquid crystal, a first polarizing plate which is arranged on a light incident side of the liquid crystal cell and transmits light of the predetermined polarization direction, and a second polarizing plate which is arranged on a light outgoing side of the liquid crystal cell and has a first region that transmits light of any polarization direction and a second region that transmits light of the predetermined polarization direction.

10. An optical recording apparatus according to claim 9, wherein the spatial light modulator is a liquid crystal panel for a projector.

11. An optical recording apparatus according to claim 9, wherein the azimuth rotator includes a first area and a second area corresponding to the first region and the second region of the spatial light modulator, the polarization direction of the light which passes through one of the first area and the second area of the azimuth rotator is rotated by  $+45^\circ$  and the polarization direction of the light which passes through the other area is rotated by  $-45^\circ$ .

12. An optical recording/reproducing apparatus comprising:

a spatial light modulator which modulates light incident from a single light source and generates signal light and reference light, the spatial light modulator modulating the signal light according to a signal to be recorded in an optical

recording medium to cause a polarization direction of the signal light to have a predetermined polarization direction and to cause a polarization direction of the reference light to have a polarization direction crossed at right angles with the predetermined polarization direction;

a polarizing beam splitter which transmits light incident from the spatial light modulator irrespective of a polarization direction thereof, the polarizing beam splitter reflecting reproducing light incident from the optical recording medium toward a predetermined direction according to a polarization direction thereof and transmitting the light incident from the optical recording medium except for the reproducing light irrespective of a polarization direction thereof;

a wavelength plate which converts linearly polarized light incident from the polarizing beam splitter into circularly polarized light and converts circularly polarized light into linearly polarized light; and

a condensing optical system which condenses light incident from the wavelength plate into a predetermined area of the optical recording medium,

wherein in the case that a hologram is to be recorded in the optical recording medium, the spatial light modulator generates the signal light and the reference light, the wavelength plate converts the generated signal light and the generated reference light into circularly polarized light in

which the signal light and the reference light revolve in directions opposite to each other, and the condensing optical system condenses the circularly polarized light, which is converted with the wavelength plate and in which the signal light and the reference light revolve in directions opposite to each other, into a predetermined area of the optical recording medium, and

in the case that that a hologram recorded in the optical recording medium is to be reproduced, the spatial light modulator generates the reference light, the wavelength plate converts the generated reference light into circularly polarized light, the condensing optical system condenses the circularly polarized light, which is converted by the wavelength plate, into a predetermined area of the optical recording medium, the wavelength plate converts obtained reproducing light into linearly polarized light, and the polarizing beam splitter reflects the converted linearly polarized light toward a predetermined direction.

13. An optical recording/reproducing apparatus according to claim 12, wherein a holographic optical element for forming a predetermined wavefront for the reference light is further arranged between the spatial light modulator and the wavelength plate.

14. An optical recording/reproducing apparatus according to claim 13, wherein the holographic optical element is a light

diffuser which diffuses the reference light.

15. An optical recording/reproducing apparatus according to claim 12, wherein the spatial light modulator comprises a transmissive liquid crystal cell in which transparent electrodes are formed on both surfaces of a plate-shaped liquid crystal, a first polarizing plate which is arranged on a light incident side of the liquid crystal cell and transmits light of the predetermined polarization direction, and a second polarizing plate which is arranged on a light outgoing side of the liquid crystal cell and transmits light of any polarization direction at a substantially central portion thereof and transmits light of the predetermined polarization direction at a portion thereof surrounding the substantially central portion.

16. An optical recording/reproducing apparatus according to claim 15, wherein the spatial light modulator is a liquid crystal panel for a projector.

17. An optical recording/reproducing apparatus according to claim 15, wherein the polarizing beam splitter has a passing hole having a diameter corresponding to the substantially central portion of the second polarizing plate.